Attitudes towards medical cannabis among family physicians practicing in Ontario, Canada: A qualitative study

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Abstract

Background: Medical cannabis has been legally available in Canada since 2001 but emerged because of legal challenges instead of empirical evidence establishing that benefits exceed the harms. We investigated attitudes towards medical cannabis among Ontario family physicians.

Methods: We conducted a qualitative research study using audiotaped, in-depth, semi-structured telephone interviews. We applied thematic analysis to interview transcripts to determine themes and constructs and identified representative quotes.

Results: Eleven physicians agreed to be interviewed, and 3 themes emerged: (1) reluctance to authorize medical cannabis, (2) concern over harms associated with use of cannabis, and 3) lack of knowledge regarding medical cannabis. Participants raised concerns about the limited evidence, and their lack of education, to guide therapeutic use of cannabis; particularly as relates to harms associated with neurocognitive development, exacerbation of mental illness, and drug-interactions in the elderly. Some physicians felt medical cannabis was overly accessible and questioned their role following legalization of recreational cannabis.

Interpretation: Family physicians may benefit from guidance and education that addresses concerns they have surrounding medical cannabis.

Keywords

Cannabis; family physicians; Ontario; medical cannabis; qualitative interview; qualitative research

Introduction

Cannabis has been legally available for select medical conditions in Canada since 2001 [1]; however, use by patients has been limited until recently. Licensed health care practitioners can provide authorization for patients to acquire medical cannabis, who in turn can then register with Health Canada to produce a limited amount of cannabis for personal use, designate another individual to produce their medical cannabis, or acquire cannabis for medical purposes through a licensed producer [2]. The number of Canadians authorized to use medical cannabis increased from 23,930 in June 2015 to 369,614 by September 2019 [3]. Market data from 2017 to 2019 shows that Ontario ranks the highest amongst all provinces regarding the amount of medical cannabis sold to clients and the total number of client registrations [4].

Patients increasingly seek guidance from physicians about therapeutic benefits and harms of therapeutic cannabis; however, despite aggressive marketing promoting use of cannabis for a wide range of conditions the supporting evidence is limited and often conflicting [5, 6]. For example, the most common indication for medical cannabis is chronic pain [7]. The National Academies of Sciences, Engineering, and Medicine concluded that patients treated with cannabis are more likely to experience a clinically significant reduction in pain symptoms [8]; however, the National Institute for Health Care and Excellence has made a strong recommendation against use of cannabis for chronic pain [9].

Physicians receive minimal education regarding cannabis during their training and in 2018 the vice-president of professionalism at the Canadian Medical Association stated that, following legalization of recreational cannabis, physicians should not be involved with therapeutic use of cannabis [10]. The purpose of this qualitative study was to investigate attitudes towards, and perceptions of, medical cannabis among Ontario family physicians. Specifically,

we explored attitudes towards medical cannabis post-legalization of recreational cannabis, views on current regulation of medical cannabis, and perceptions regarding risks and benefits of therapeutic cannabis.

Methods

Study Design

We conducted a descriptive qualitative research study [11] and used thematic analysis [12] to explore attitudes towards medical cannabis among family physicians in Ontario, Canada. Participant interviews were facilitated with an interview guide (**Table 1**) consisting of open-ended questions; we developed and tested our interview guide in accordance with McGrath et al. (2019)'s method [13]. We followed the Search Results Web results consolidated criteria for reporting qualitative research (COREQ) checklist for reporting our findings (**Appendix 1**) [14]. The Hamilton Integrated Research Ethics Board approved our study (project number: 5458).

Participant sampling and recruitment

Family physicians practicing in Ontario, Canada, were eligible for our study. Between January and October 2019, we contacted a total of 21 family physicians; eight declined to participate, and 2 were found to be ineligible (not actively practicing), while the remaining 11 agreed to participate in our study. We acquired our participants through snowball sampling [15]. This process began with JWB reaching out to a family physician to provide contact information of colleagues that held different views towards medical cannabis to be approached to be interviewed for our study. We then asked physicians who agreed to participate for contact

information of other family physicians to interview. This continued until we interviewed enough physicians that provided us with a range of perspectives on medical cannabis to achieve saturation of themes [16]. Prior to being interviewed, each participant was sent an information letter and a consent form outlining the purpose of the study and how confidentiality would be maintained.

Data Analysis

After providing consent, each physician was interviewed by phone by one of us (JYN, KG or SU); all interviews were audio-recorded. JYN has training in qualitative interviewing and provided supervision and training to KG and SU. We stopped recruitment when three members of our team (JYN, YC, JWB) agreed that saturation of themes had been achieved. Transcripts were not returned to participants and no follow up interviews were conducted.

KG and SU transcribed all audio-taped interviews verbatim. We ensured anonymity of all study participants by replacing names with a study identification number in all transcribed documents and interview notes. We analysed all interview data applying inductive thematic analysis, which has been shown to be effective in investigating and describing a range of experiences [17]. We adopted a realist approach to our analysis whereby we took practitioners' reports at face value assuming they would report truthfully about their beliefs and attitudes. [18] Two of us (JYN and YC) began by reading the interview transcripts and field notes several times. Next, the same individuals coded and aggregated transcribed text into meaningful themes and labeled constructs. The reviewers used an open coding process to establish the primary categories of information from each transcript, independently and in duplicate, and then connected the categories to derive main themes. Any disagreements were resolved by discussion.

Based on the codes generated from the analysis, the same two reviewers generated a set of theoretical propositions, independently and in duplicate, and achieved consensus. Last, all team members (JYN, KG, SU, YC and JWB) reviewed the results and confirmed the main themes of our study findings. Themes and subthemes were supported by identification of supporting quotes. Both manual coding and NVivo 12 Software (QSR International) were used to conduct the analysis.

Results

Our participants included six men and five women, who had been in practice for a median of 4 years (range = 1 to 29). Eight attended medical school in Canada, four abroad, and all had completed their family medicine residency in Canada. One participant held additional specialization in public health and preventive medicine (**Table 2**). Mean interview time was approximately 30 minutes.

Main themes

We identified three main themes: (1) reluctance to authorize medical cannabis, (2) concern over harms associated with medical cannabis, and (3) lack of knowledge surrounding medical cannabis. Each theme contained four subthemes; participant quotes supporting thematic analysis are shown in **Table 3**.

Theme 1: Reluctance to authorize medical cannabis

Subtheme: Lack of evidence

Eight physicians felt the evidence supporting the use of cannabis for medical purposes was limited. Specifically, they advised that clinical trials were often poorly designed, followed patients for short time-periods and did not inform long-term effects, and benefits in trials demonstrating statistical significance was typically very modest. Two physicians felt more scientific research providing evidence of effectiveness was needed before cannabis should be offered to patients. Respondents particularly noted evidence gaps regarding harms of cannabis among children, emerging adults and the elderly, the effects of cannabis on driving capacity, and whether the net benefit to harm ratio was favorable or not for management of mental illness (e.g. post-traumatic stress disorder, anxiety).

Subtheme: Indications for therapeutic use

All 11 participants felt that cannabis may be helpful for management of chronic pain, particularly neuropathic pain. Five perceived a therapeutic role for anxiety, four for insomnia, and individual physicians endorsed multiple sclerosis, relief from chemotherapy-induced nausea and vomiting, and appetite stimulation as indications. Medical cannabis was not participant physicians' first line of treatment for any of these conditions and was considered only after other treatment options had failed, or on request by patients.

Subtheme: Discomfort with therapeutic use of cannabis

Six physicians avoided authorizing medical cannabis altogether, and two only prescribed synthetic cannabis (i.e. Nabilone). Of the remaining physicians that supported therapeutic use of

cannabis for some of their patients, they reported a lack of knowledge regarding what type of cannabis should be used and how to pursue dosing and optimal monitoring. As a result, they preferred to refer patients to colleagues that had an interest in cannabis instead of authorizing medical cannabis themselves.

Subtheme: Openness to emerging evidence

Despite the perceived lack of evidence and reluctance to authorize medical cannabis, three participants noted it was important to keep an open mind regarding this therapeutic option. They were willing to consider that cannabis may have a role in healthcare, acknowledged that patients were increasingly asking about them about therapeutic cannabis, and were aware of the need to address their own biases when engaging in discussions on this topic.

Theme 2: Harm associated with the use of cannabis

Subtheme: Effect on neurocognitive development

Four physicians raised concerns about the effect of cannabis on neurocognitive development and queried whether cannabis use among adolescents and young adults may predispose them to mental illness later in life. Some physicians felt that setting the legal age for use of recreational cannabis at 18 may give the impression that use was safe for therapeutic use at this age. Others raised concerns that some licensed cannabis producers may be targeting adolescents with their marketing strategies.

Subtheme: Harms in the elderly

Two physicians raised concerns about cannabis use among the elderly, including the potential for drug interactions given the common occurrence of polypharmacy in this population. They also raised concerns regarding adverse events associated with cannabis use, such as dizziness and sedation, and how this may affect elderly patient's quality of life, ability to drive, and capacity to care for themselves.

Subtheme: Exacerbation of mental illness

Three physicians expressed concern over the impact of cannabis use on either pre-existing mental illness, or the potential to cause mental illness. Participants noted that cannabis use may exacerbate patient's symptoms of depression or anxiety or interfere with sleep and acknowledged evidence to implicate cannabis use in early onset psychosis among emerging adults.

Subtheme: Concerns regarding cannabis clinics

Although physicians we spoke with largely referred patients who were interested in pursuing medical cannabis to practices that focussed on this modality, three raised concerns about the quality of care provided through cannabis clinics. There was a perception that very few (if any) interested patients were denied cannabis, and that most patients were not provided with a detailed explanation of possible harms. One physician highlighted their experience that patients with co-morbid mental illness, including substance use disorder, found it easy to access medical cannabis though these clinics.

Theme 3: Knowledge about medical cannabis

Subtheme: Inadequate training

Five physicians described their knowledge of medical cannabis as insufficient in regard to clinical indications, dosing, or monitoring. Older physicians were not exposed to information on medical cannabis in medical school or residency, while more recent graduates encountered some lectures but were not well-versed on the topic. Our participants felt that acquiring training in the use of medical cannabis required them to seek out online courses and relevant conferences.

Subtheme: Continuing education

Nine physicians expressed an interest in receiving education regarding medical cannabis. When asked what kind of training and education they wished to receive, answers were mixed and often related to their patient population. Some physicians expressed an interest in general topics, such as clinical indications for cannabis and dosing.

Subtheme: Physician's role regarding medical cannabis

Two physicians expressed frustration regarding their role with medical cannabis due to the atypical nature of the intervention and the limited impact of their involvement. Specifically, medical cannabis does not have to be dispensed by a pharmacist, authorizing cannabis does not lower the cost for patients, and physicians cannot control the composition of cannabis used for therapeutic purposes. One physician felt that there was no role for the medical profession to remain involved in therapeutic cannabis following legalization for recreational purposes.

Subtheme: Recreational vs. medical cannabis

Six physicians raised the issue of how legalization of recreational cannabis affected its' therapeutic use. Ten participants felt there was merit to preserving a separate stream for medical use, due to the higher likelihood of more rigorous regulation for medical cannabis; specifically, more consistent products adhering to higher safety standards.

Interpretation

Family physicians in our study were reluctant to authorize medical cannabis due to perceptions of limited supporting evidence and uncertainty regarding clinical indications and associated harms. Those willing to consider use of medical cannabis typically referred interested patients to clinics that focussed on this therapy but were concerned that such clinics may provide cannabis indiscriminately without comprehensive discussion of the possible benefits and harms. One participant questioned whether there remained a role for medical cannabis after legalization for recreational purposes, but most physicians acknowledged that medicinal cannabis would likely adhere to more rigorous quality standards. Participants were largely supportive of both research and continuing education to inform the role of medical cannabis for their patients.

Our findings are in keeping with other published studies that have found physicians do not have a consolidated perspective as to whether cannabis is a medicine or not, and have concerns regarding the limited evidence base for medical cannabis [19-22]. Regardless, many participants stressed the importance of keeping an open mind and considering patients' values and preferences.

We found that physicians had multiple concerns associated with patients' medical cannabis use, and there is evidence to suggest possible harms regarding neurocognitive

development [23, 24, 25], polypharmacy in elderly users [26, 27], exacerbation of mental illness [28, 29], and lack of standards and quality of care provided through cannabis clinics [30, 31]. Physicians felt their training in medical cannabis was lacking, and their interest in continuing medical education in this area is consistent with other surveys [19, 20, 32-34].

Only one of our participants questioned whether physicians should remain involved with medical cannabis, which is consistent with the CMA's current position; however, the Canadian Federation of Medical Students has released a position statement calling for increased cannabis education during medical training [35]. The increasing use of cannabis by Canadians suggests that family physicians should continue to address the challenge of discussing use of medical cannabis with interested patients [36]. Open discussions may promote shared decision making and provide opportunities to assist patients in differentiating evidence from hyperbole [37].

Interpretation of findings

Our study highlights the importance of addressing family physicians' knowledge gaps and concerns surrounding medical cannabis. Further research should investigate needs of family physicians, as well as medical students and residents, regarding cannabis education [20, 38]. Increased knowledge of the evidence for benefits and harms of medicinal cannabis may improve physician's comfort to discuss this topic with interested patients and reduce reliance on cannabis clinics which may not always provide impartial advice [39-41].

Strengths and limitations

We employed several techniques to ensure reflexivity and to increase the credibility of our study, including use of transcribed audio-recorded interviews and using participants' quotes to support our findings. There are limitations associated with this study. First, the snowball sampling method that we used to identify our participants precludes confident inferences about populations based on the obtained sample. Second, our sample size was not large; however, we sampled to saturation which suggests that additional interviews would be unlikely to affect our findings. Third, participants may have censored their answers in order to appear as 'good participants' (social desirability bias); however, many physicians we spoke with were forthcoming regarding their concerns about medical cannabis.

Conclusion

Family physicians in our study were uncertain regarding the therapeutic potential of medicinal cannabis, except for chronic pain and particularly neuropathic pain for which all felt the evidence supported effectiveness. Most physicians did not provide therapeutic cannabis to their patients and expressed uncertainty regarding harms and appropriate use. Family physicians may benefit from guidance and education that addresses concerns they have surrounding medical cannabis.

Consent for Publication

All authors consent to this manuscript's publication in the order in which the authors are listed.

Conflicts of Interests

The authors declare that they have no conflicts of interests.

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This study was unfunded.

Authors' Contributions

JYN: co-conceptualized and co-designed the study, conducted interviews, interpreted and analysed the data, drafted the manuscript, and gave final approval of the version to be submitted.

KG: conducted interviews, provided contributions and critically revised the manuscript, and gave final approval of the version to be submitted.

SU: conducted interviews, provided contributions and critically revised the manuscript, and gave final approval of the version to be submitted.

YC: interpreted and analysed the data, provided contributions and critically revised the manuscript, and gave final approval of the version to be submitted.

JWB: co-conceptualized and co-designed the study, interpreted and analysed the data, provided contributions and critically revised the manuscript, and gave final approval of the version to be submitted.

All authors have read and approved the manuscript.

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Tables

Table 1: Interview Guide

Table 2: Participant Demographics

Table 3: Participant Quotes Supporting Thematic Analysis

Appendices

Appendix 1: Consolidated Criteria for Reporting Qualitative Research (COREQ) Checklist

References

1. Government of Canada. Understanding the New Access to Cannabis for Medical Purposes Regulations [Internet]. 2016. [cited Aug 05 2020]. Available from https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/understanding-new-access-to-cannabis-for-medical-purposes-regulations.html
2. Health Canada. (2017). Medical Document Authorizing the use of Cannabis for Medical Purposes under the Access to Cannabis for Medical Purposes Regulations - Canada.ca. Retrieved from https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/licensed-producers/sample-medical-document-marihuana-medical-purposes-regulations.html
3. Health Canada. (2020). Data on cannabis for medical purposes – Canada.ca. Retrieved from https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/research-data/medical-purpose.html
4. Health Canada. (2018). Market Data - Canada.ca. Retrieved from https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/licensed-producers/market-data.html
5. Health Canada. Information for Health Care Professionals: Cannabis (marihuana, marijuana) and the cannabinoids [Internet]. 2018. [cited Aug 05 2020]. Available from: https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/information-medical-practitioners/information-health-care-professionals-cannabis-cannabinoids.html#chp71
6. Allan MG, Finley CR, Hauptman R, Beahm NP. Missing 'high' quality evidence for medical cannabinoids for pain? Alberta College of Family Physicians, Tools for Practice. 2017

7. Boehnke KF, Gangopadhyay S, Clauw DJ, Haffajee RL. Qualifying Conditions Of Medical Cannabis License Holders In The United States. Health Affairs. 2019 Feb;38(2):295–302.
8. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Population Health and Public Health Practice; Committee on the Health Effects of Marijuana: An Evidence Review and Research Agenda. Washington (DC): National Academies Press (US); 2017 Jan 12.
9. NICE Clinical Practice Guidelines Expert Committee. Cannabis-based medicinal products. NICE. 2020. 2019, Nov 11
10. Datac. Medicinal cannabis programme to continue without CMA blessing. [Internet] 2018. [cited Aug 05 2020]. Available from: https://datac.ca/medicinal-cannabis-programme-to-continue-without-cma-blessing/
11. Sandelowski M: What's in a name? Qualitative description revisited. Res Nurs Health. 2010; 33(1): 77-84.
12. Vaismoradi M, Turunen H, Bondas T: Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. Nurs Health Sci. 2013; 15: 398-405.
13. McGrath C, Palmgren PJ, Liljedahl M. Twelve tips for conducting qualitative research interviews. Medical teacher. 2019 Sep 2;41(9):1002-6.
14. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. International journal for quality in health care. 2007 Dec 1;19(6):349-57.
15. Miles MB, Huberman AM: Qualitative Data Analysis: A Sourcebook of New Methods. 2nd ed. Thousand Oaks, CA: Sage, 1994.

16. Ando H, Cousins R, Young C. Achieving saturation in thematic analysis: Development and refinement of a codebook. Comprehensive Psychology. 2014 Jan 1;3:03-CP.

17. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology. 2006;3(2):77-101

18. Hayes N (2000). Doing Psychological Research. London: Sage

19. Islam A. *Investigating the Clinical Decision-Making Process of Physicians in Rural Ontario: The Perspectives and Attitudes on Medical Cannabis* (Doctoral dissertation). 2019.

20. Shahi A, Allain S, Turner S, Bailey K. Cannabis Therapy Knowledge Study: Toward Establishing a Pedagogical Tool. University of Ottawa Journal of Medicine. 2018 Nov 15;8(2):19-22.

21. Zolotov Y, Vulfsons S, Zarhin D, Sznitman S. Medical cannabis: An oxymoron? Physicians' perceptions of medical cannabis. International Journal of Drug Policy. 2018 Jul 1;57:4-10.

22. Szaflarski M, McGoldrick P, Currens L, Blodgett D, Land H, Szaflarski JP, Segal E. Attitudes and knowledge about cannabis and cannabis-based therapies among US neurologists, nurses, and pharmacists. Epilepsy & Behavior. 2020 Aug 1;109:107102.

23. Lubman DI, Cheetham A, Yücel M. Cannabis and adolescent brain development. Pharmacology & therapeutics. 2015 Apr 1;148:1-6.

24. Bossong MG, Niesink RJ. Adolescent brain maturation, the endogenous cannabinoid system and the neurobiology of cannabis-induced schizophrenia. Progress in neurobiology. 2010 Nov 1;92(3):370-85.

25. Camchong J, Lim KO, Kumra S. Adverse effects of cannabis on adolescent brain development: a longitudinal study. Cerebral cortex. 2016 Feb 23;27(3):1922-30.

26. MacCallum CA, Russo EB. Practical considerations in medical cannabis administration and dosing. European Journal of Internal Medicine. 2018 Mar;49:12–9.

27. Abuhasira R, Schleider LB-L, Mechoulam R, Novack V. Epidemiological characteristics, safety and efficacy of medical cannabis in the elderly. European Journal of Internal Medicine. 2018 Mar;49:44–50.

28. Lowe DJ, Sasiadek JD, Coles AS, George TP. Cannabis and mental illness: a review. European archives of psychiatry and clinical neuroscience. 2019 Feb 1;269(1):107-20.

29. Hill KP. Cannabis use and risk for substance use disorders and mood or anxiety disorders. Jama. 2017 Mar 14;317(10):1070-1.

30. Lucas P, Walsh Z. Medical cannabis access, use, and substitution for prescription opioids and other substances: A survey of authorized medical cannabis patients. International Journal of Drug Policy. 2017 Apr 1;42:30-5.

31. Fitzcharles MA, Shir Y, Häuser W. Medical cannabis: strengthening evidence in the face of hype and public pressure. Canadian Medical Association. Journal. 2019 Aug 19;191(33):E907-8.

32. Sagy I, Peleg-Sagy T, Barski L, Zeller L, Jotkowitz A. Ethical issues in medical cannabis use. European journal of internal medicine. 2018 Mar 1;49:20-2.

33. Pierre MS, Matthews L, Walsh Z. Cannabis education needs assessment among Canadian physicians-in-training. Complementary Therapies in Medicine. 2020 Mar 1;49:102328.

34. Karanges EA, Suraev A, Elias N, Manocha R, McGregor IS. Knowledge and attitudes of Australian general practitioners towards medicinal cannabis: a cross-sectional survey. BMJ open. 2018 Jun 1;8(7):e022101.

35. Hartman M, Lasry D, Khan AU, Wu H, Kassam S, Wong A, Litwin O, Khan H, Siddall J, Sharma I, Sit D. Canadian Federation of Medical Students Position Statement on Recreational Cannabis Legalization. 2018.

36. Ng JY, Garber A, Luong M, Cooley K, Busse JW. No improvement in disclosure of natural health product use to primary care medical doctors in the last 15 years: A survey of naturopathic patients. Complementary Therapies in Clinical Practice. 2020 May 1;39:101106.

37. Connie. FDA Crackdowns on False Claims Made by Cannabis Advertisers [Internet]. PharmOut. 2019 [cited Aug 5 2020]. Available from: https://www.pharmout.net/fda-crackdowns-false-claims-cannabis-cbd-medicine-advertisements/

38. Ziemianski D, Capler R, Tekanoff R, Lacasse A, Luconi F, Ware MA. Cannabis in medicine: a national educational needs assessment among Canadian physicians. BMC medical education. 2015 Dec 1;15(1):52.

39. Kansagara D, Morasco BJ, Iacocca MO, Bair MJ, Hooker ER, Becker WC. Clinician Knowledge, Attitudes, and Practice Regarding Cannabis: Results from a National Veterans Health Administration Survey. Pain Medicine. 2020 Jan 7.

40. Zylla D, Steele G, Eklund J, Mettner J, Arneson T. Oncology clinicians and the Minnesota Medical Cannabis Program: A survey on medical cannabis practice patterns, barriers to enrollment, and educational needs. Cannabis and cannabinoid research. 2018 Oct 1;3(1):195-202.

41. Philpot LM, Ebbert JO, Hurt RT. A survey of the attitudes, beliefs and knowledge about medical cannabis among primary care providers. BMC family practice. 2019 Dec;20(1):17.

Table 1: Interview Guide

1. Do you have any patients that currently use medical cannabis?
2. What conditions (if any) do you perceive medical cannabis may have role in management?
3. Do you feel that patients who use cannabis experience specific beneficial effects?
4. Are you concerned about harms associated with medical cannabis use?
5. Do you feel that some patients may access medical cannabis for recreational purposes?
6. Should the legalization of recreational cannabis affect use of medicinal cannabis?
7. Do you authorize medical cannabis for patients? Why or why not?
8. What are your impressions about the evidence underlying medical cannabis?
9. What are your thoughts on the Canadian Medical Association's stated position to move away from medical cannabis once recreational use is legal?
10. What is your knowledge regarding medical cannabis?
11. What are your impressions about the current regulation of medical cannabis?
12. What education regarding medical cannabis, if any, would you like to receive?
13. Where do you feel future research regarding medical cannabis should be directed?
14. Are there any final thoughts you would like to add regarding the administration and use of medical cannabis?

Table 2: Participant Demographics

Independent Family Medicine Practice Since	Sex	Attended Medical School Canada or Abroad
2019	Male	Canada
2018	Female	Canada
2017	Female	Abroad, UK
2017	Male	Canada
2016	Male	Abroad, Caribbean
2016	Male	Abroad, Caribbean
2016	Male	Canada
2007	Female	Canada
1998	Male	Canada
1997	Female	Canada
1990	Female	Canada

Table 3: Participant Quotes Supporting Thematic Analysis

Theme/Subtheme	Representative Quote(s)
Theme 1: Authorization of medical cannabis	
Subtheme 1: lack of evidence	"I don't think most of the results of studies are that strong, they're not really well-designed studies for the most part…" - MC001 "… some studies show that it's really effective and some studies show that it's not very effective. I suspect we've reached the point where we're probably a little too liberal for the conditions we prescribe it for." – MC009
Subtheme 2: indications for therapeutic use	"it's an okay adjunct, but it wouldn't be my first line for pain control at all." – MC002 "… it's more of a second- or third-line treatment...certain patients will find it helpful" – MC004 "there's very few things, if any, that I would go to medical cannabis as my first medication to treat." – MC008
Subtheme 3: discomfort with therapeutic use of cannabis	"I'm not 100% comfortable prescribing it, I do feel it might be helpful for some conditions, but I'm just not sure of the entire process of how to go about prescribing it and monitoring its use." – MC001 "I don't prescribe it at all, I usually refer it out to clinics who are specialized in that." – MC002 "I would be happy if it went away, in terms of [the] physician's responsibility towards it. I do not want to be prescribing marijuana" – MC006
Subtheme 4: openness to emerging evidence	"I think you have to keep an open mind, and you have to be attuned to what your patients are telling you…if you're not willing to listen to what patients are telling you about what they're using, and you don't present an unbiased front, then people aren't going to tell you what they're doing." – MC009 "I think that we need to make sure we are providing our patients with access to evidence-based treatment and addressing any financial barriers and any stigma that may exist around particular treatments. I think we need to be careful of that when we are thinking about prescribing medical marijuana." – MC011
Theme 2: Harm associated with the use of cannabis	

Subtheme 1: Effect on neurocognitive development	"there is so much research saying that the brain is still changing and the reality is we don't know what happens to kids' brains when they take marijuana at the age of fifteen. And you know, I have so many patients who are young, who are like, "oh well now that is legalized for the age of eighteen, [and] I'm fourteen and I'm so close, I'm sure it is fine". And I think the fact that legalization, especially at such a young age, gives the message to a lot of people that it's safe." – MC010
Subtheme 2: Harms in the elderly	"Maybe sort of looking at long term effects on older people. All the medications we prescribe, there are certain geriatric populations that take various medications so I just want to know if there's anything in particular or things to watch for." – MC002 "…what is the effect of adding a cannabis product into a geriatric population that tends to be already medically more complex and already on lots of other medications and have multiple comorbidities? So, what impact does that have potentially, on their quality of life, ability to continue to drive a car, ability to continue to take care of themselves, and maybe dependence issues." – MC009
Subtheme 3: Exacerbation of mental illness	"Our patients have mental health issues, ranging from depression to anxiety to schizophrenia, and you know, you worry about harms for people especially for people who have [mental] illnesses." – MC006 "So some of the [symptoms] I've noticed so far have been an increase in anxiety, difficulty with sleep, even cases of potential psychosis." – MC007
Subtheme 4: Concerns regarding cannabis clinics	"Cannabis clinics are fairly easy to access for most of these [patients]." – MC004 "I would, for the most part, send patients to marijuana [clinics]; there are a couple in Hamilton. Everyone wound up getting it. Most people that did had addiction issues and mental health issues." – MC006 "I've had patients who've come in and were prescribed medical cannabis and I would be like "oh you are so young, did the people go through the risks with you?" and they were like "no not really" and so I think that concerns me because it seems like even depending on which cannabis clinic certain people are referred to, they are not necessarily being presented with both the pros and the cons." – MC010
Theme 3: Lack of knowledge surrounding medical cannabis	
Subtheme 1: Inadequate training	"I'd say my knowledge of [medical cannabis] is pretty average… average enough to know that I would refer someone else to [authorize] medical cannabis if I thought it would help. And also enough to say that it won't help with your kind of pain or your set of conditions. So, I would know enough about that, but in terms of dosing and things like

	that I am not as comfortable, but it's not something I sought to really train in." – MC002 "I went to medical school 35 years ago, there was zero training about cannabis and anything I learned about cannabis has been through continuing education that consists of online courses and information, position statements and summaries, sessions at conferences... So, the training has been whatever I chose to participate in, there's nothing required of me." –MC005 "We did have some lectures from physicians in residency, [and] we also read a few articles during that time as well. I definitely don't know all of the up to date research that's ongoing in marijuana, it's just the things that I'm coming across." – MC007
Subtheme 2: Need for further training and education	I just don't know what the regulations are in terms of how that's monitored, so my [further] education would hopefully help me figure out where I can direct patients to, sort of more, reputable sources of marijuana once it's been prescribed." – MC002 "Something that comes out from time to time, that would actually be very helpful to get updates about what's [new] with medical cannabis." – MC007
Subtheme 3: Physcians' role regarding cannabis	"[Regarding medical cannabis], it is still not a prescription. A prescription includes the name of a substance, exactly what is in it, it includes a dosage, frequency, and duration. And it is dispensed by a pharmacist. None of those criteria are being fulfilled by cannabis. I am a little bit lost right now about what my form actually does for anyone. I think anyone and his dog can walk into a drug store and get whatever they want without approval from a physician." – MC004 "Pretending that marijuana/cannabis is a prescription has been a joke…There is nothing about dosing or actual content; the traditional approach to making cannabis accessible really has just been to say this person has a medical condition and I believe this person may benefit from medical cannabis... Right now, it's very confusing why I have any role in making cannabis accessible to anyone. Whatever I write or say on a form does not decrease the cost of it. It does not make it funded, and it still does not provide any instructions that have to be followed … I would love to see [the] medical profession removed from the transaction completely and to make [cannabis] more like alcohol." – MC005
Subtheme 4: Recreational vs. medicinal cannabis	"I'm not sure how [recreational] products are regulated and if they know how much THC or CBD is in it, so I am not sure if [using recreational cannabis for therapeutic purposes] would be a good idea." – MC003

	“I think it's still helpful… being prescribed medical cannabis because a lot of people are not sure what's the best time to take it for medical reasons. I still think there's a role for medical cannabis even if recreational cannabis is approved for use now.” – MC004